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Jim Doyle, Governor
Richard J. Leinenkugel, Secretary

December 14, 2009

Sharleen Phillips
U.S. Environmental Protection Agency
Air and Radiation Division, Mail Code: AR-18J
77 West Jackson Boulevard
Chicago, IL 60604

Re: Grant # XA-00E16001-0
Maximizing Emission Reductions in Wisconsin's Heavy Duty Diesel Truck Fleet

Final Report

Progress

In 2006, the Wisconsin Department of Commerce (Commerce) received a $50,000 grant from the U.S. Environmental Protection Agency for a project to cut emissions from heavy-duty diesel trucks that operate in Wisconsin and the Midwest. The grant is part of Region 5's Midwest Clean Diesel Initiative (MCDI), a collaboration of federal, state and local agencies, along with communities, non-profit organizations and private companies working together to reduce emissions from diesel engines in the Midwest. MCDI estimates there are more than 3 million engines in the Midwest that would benefit from new pollution-reduction technology.

This project supported Goal 1 of EPA's 2003-2008 Strategic Plan, which states "Through 2010…[EPA will]...protect human health and the environment by attaining and maintaining health based air quality standards and reducing the risk from toxic air pollutants." It also assisted EPA in fulfilling the mission of the Midwest Clean Diesel Initiative to reduce emissions of one million engines in the Midwest by 2010.

The program explored the emission reductions that can be achieved by installing diesel exhaust retrofit equipment (new exhaust systems). Information gained from the program increased the knowledge base of motor carriers and others. Commerce was successful in awarding $50,000 to three Wisconsin motor fleets. Funding provided through this project led to the procurement of twenty-one (21) U.S. EPA/California Air Resources Board (CARB) verified diesel retrofit technologies.

Obstacles Encountered

In the course of this project, the United States experienced one of the worst economic downturns in history. As a result, the trucking industry was hit hard with less shipments and demand for their services. This downturn, made it very difficult for trucking companies to invest in new technologies even if grant funds covered 100% of the cost of new technologies. Fleets stated that investments, such as the purchasing of new trucks and/or technologies, were being delayed until the economy rebounded.

During the project Commerce received a total of seven applications from motor carriers. Three motor fleets received funding from Commerce as described below ("expenditure of funds").

Fleets not funded:

- Fleet A: submitted application July 16, 2007 and supplemental information on August 9, 2007. Once Commerce received all of the required information, Fleet A was preliminarily approved for funding. The fleet contacted Commerce shortly after receiving award notification to ask for 100% of grant funds. EPA approved this requests, but Fleet A decided to withdraw from award consideration. The fleet stated the following in withdrawing from award consideration: "*After looking at our budget and projects that are ahead of us for the fall we will not have the money or the time to invest in the grant. We apologize for any inconvenience this may cause. We realize the time you have invested in this. We appreciate your willingness to work with us on this matter, but find that it is not in the best interest of our company to pursue the grant.*"

- Fleet B: incomplete application. Application was submitted by a vendor and didn't include all the required information (e.g., company/truck information). After following up with the vendor, the fleet decided not to pursue funding because of pending economic worries.
- Fleet C: owner operator submitted an application proposing to purchase a diesel oxidation catalyst. During correspondence with the motor carrier it was determined their intent was to meet California Air Resources Board (CARB) diesel rules, allowing the truck to transport freight in California. After discussions with vendors and others, the motor carrier was reluctant to purchase more expensive technologies that would meet CARB rules, such as diesel particulate filters. Therefore the motor carrier withdrew from award consideration.
- Fleet D: submitted application September 28, 2007. Commerce preliminarily approved this fleet for funding on October 5, 2007. On November 5, 2007 Fleet D returned a marked up contract to Commerce asking for a revised contract. Commerce determined the changes in the contract that were requested, were acceptable. Commerce followed up with Fleet D periodically for status updates, but on July 22, 2008; Fleet D withdrew from award consideration. The following reason for withdrawing was emailed to Commerce: "*after much research we have decided not to use the grant money, sorry for the inconvenience*."

Although there was a delay in disbursing funds, Commerce successfully allocated the full allotment of award funds.

Expenditure of Funds (all funds have been disbursed):
The Department of Commerce awarded the following motor fleets (emission estimates were calculated using EPA's Diesel Emission Quantifier):

- **Wangerin Trucking**
  Award Amount: $12,151.28
  Funds were used to purchase and install eight (8) diesel oxidation catalysts (DOCs)

  Wangerin Trucking
  Contact: Kris Wangerin, Vice President
  1817 Church Street
  Marinette, WI 54143
  Phone: 715-732-2855
  E-mail: kris@wangerintrucking.com

  Estimate Percent of Particulate Matter Reductions: 20%
  Estimate Percent of Hydrocarbon Reductions: 50%
  Estimate Percent of Carbon Monoxide Reductions: 30%

- **Gundrum Trucking, Inc.**
  Award Amount: $13,196.72
  Funds were used to purchase and install six (6) diesel oxidation catalysts (DOCs) and one (1) auxiliary power unit.

  Gundrum Trucking, Inc.
  Contact: Scott Gundrum, President
  4925 Arthur Road
  Slinger, WI 53086
  Phone: 262-644-6301
  E-mail: scottgundrum@gundrumtrucking.com

  Estimate Percent of Particulate Matter Reductions: 21%
  Estimate Percent of Hydrocarbon Reductions: 43%
  Estimate Percent of Carbon Monoxide Reductions: 26%
  Estimate Percent of Oxides of Nitrogen Reductions: 5%
  Estimate Percent of Carbon Dioxide Reductions: 1%

- **W & A Distribution Services, Inc.**
  Awarded Amount: $24,652.00
  Funds were used to purchase and install four (4) diesel oxidation catalysts (DOCs) and two (2) Partial Continuously Regenerating Technologies ($PCRT_2$).

  W & A Distribution Services, Inc.
  Contact: Dave Kutz
  1618 Summit Drive
  Fort Atkinson, WI 53538
  Phone: 920-568-2076
  Email: dkutz@wnad.com

  Estimate Percent of Particulate Matter Reductions: 30%
  Estimate Percent of Hydrocarbon Reductions: 58%
  Estimate Percent of Carbon Monoxide Reductions: 45%

Lessons Learned

In the same year Commerce received project funding from U.S. EPA (2006), Commerce also began implementing the Wisconsin Diesel Truck Idling Reduction Grant Program. The program assists motor carriers in the purchase and installation of idle reduction technologies. Motor carriers are eligible for grants up to 50% of the cost to purchase and install idle reduction technologies on 1999 or newer long haul diesel trucks. Idle reduction technologies reduce costs (e.g., fuel) and air emissions by providing heat, air conditioning and power to auxiliaries. Under the idle reduction grant program, it is very easy to identify payback through fuel savings. Under this retrofit project, it was difficult to show savings and more specifically payback.

Through this project, motor carriers often confused retrofit with idle reduction technologies. Once motor carriers figured out that the project covered the cost of retrofits (e.g., Diesel Oxidation Catalysts or DOCs) and not idle reduction technologies (e.g., Auxiliary Power Units or APUs) they would decline participation (note: EPA approved idle reduction technologies as retrofits at the end of the project cycle).

Observations of fleets participating in the project:

- **Increased fuel mileage**: One of the fleets awarded, that installed DOCs, saw an increase in fuel mileage, but attributed the increase to engine break-in, stating: "*I think the increase in fuel mileage came more from engine break-in than anything else. Almost all of these trucks had less than 100,000 on them when the retrofits were installed. We usually notice a big jump at about 100,000 miles for MPG. Some of these trucks ended up with idle reduction equipment being installed during the time this data was collected but most of them had it on from the beginning*."

- **Capturing truck operation data**: Motor carriers/fleets capture truck operation data differently. Many motor carriers/fleets don't frequently conduct engine downloads so if a baseline report is requested, the truck download may include operational data from prior years (ECM download will go back to when the last download was conducted). Therefore, it is important to look at a number of factors, such as distance traveled, gross weight transported, idle time (taking into account downtimes – potentially calculating idle time as idle hours per 1,000 miles traveled), etc.; prior to forming conclusions.

- **Analyzing truck operation data**: Commerce received the following input regarding truck data: "*When someone tries to compare current or one year data to historic data there can be many causes for the data to look invalid. For example, a fleet of tanker trucks may only haul full one way and then run empty back to the loading location if the unit is dedicated to a shipper. The same unit may not be assigned to the same shipper and later may haul product both ways. This can greatly change the fuel economy of the truck and can change the annual miles that the truck travels*."

- **Idle percentages** can vary greatly from year to year if the truck runs in a different area from the previous year. Weather also will make a difference in the data.

- **Retrofits vs Idle Reduction Technologies:** After 3+ years of field testing idle reduction technologies, Wisconsin motor carriers clearly accept idle reduction equipment as a cost saving necessity. The majority of motor carriers/fleets identify cost savings as their number one factor in making investments into new technologies. Many motor carriers that contacted Commerce stated that reducing air pollution was important, but if new equipment didn't positively affect their bottom line (cost savings), they would not make the investments into the new technology unless they had to (e.g., trading older trucks for new models). Therefore, emissions data is not a driving factor in the purchase of new equipment for trucking companies.

Additional Results

Technical Aspects
Using EPA's Diesel Emission Quantifier, the purchase of twenty-one diesel retrofit technologies resulted in the following tons per year (TPY) emission reductions:

ANNUAL EMISSIONS AND REDUCTIONS (in tons per year, TPY)
- PM reduced by 23.2% (baseline 0.6592 TPY; reductions 0.1527 TPY)
- HC reduced by 50.0% (baseline 0.9654 TPY; reductions 0.4827 TPY)
- CO reduced by 32.9% (baseline 5.7070 TPY; reductions 1.8752 TPY)
- NOx reduced by 1.7% (baseline 21.3464 TPY; reductions 0.3581 TPY)
- CO2 reduced by 0.4% (baseline 3,885.0000 TPY; reductions 15.5578 TPY)

LIFETIME EMISSIONS AND REDUCTIONS (in tons)
- PM reduced by 23.2% (baseline 9.9730 tons; reductions 2.3110 tons)
- HC reduced by 50.0% (baseline 14.6063 tons; reductions 7.3032 tons)
- CO reduced by 32.9% (baseline 86.3472 tons; reductions 28.3712 tons)
- NOx reduced by 1.7% (baseline 322.9717 tons; reductions 5.4181 tons)
- CO2 reduced by 0.4% (baseline 58,780.0500 tons; reductions 235.3889 tons)

Publications: (enclosed with the submittal of this report is the factsheet and application form that were used implementing the project.)

Copyright Materials: N/A

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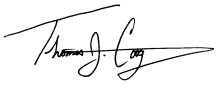
Respectively submitted by,



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